



# Runoff Risk Decision Support

Utilizing NWS Modeling to Help Improve the Nation's Water Quality

## WHAT IS RUNOFF RISK DECISION SUPPORT?

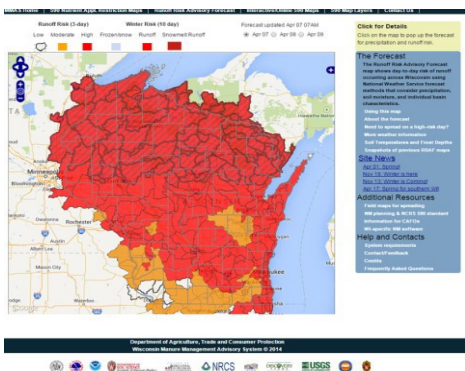
Runoff Risk decision support is real-time forecast guidance focused on improving nutrient application timing decisions so that freshly applied nutrients are not promptly transported from fields and into streams and lakes. Relying on National Weather Service (NWS) modeling, on-farm monitoring data, and multi-partner collaboration, these state led tools are a comprehensive science based approach addressing desired state and regional nutrient reduction goals. Ultimately Runoff Risk decision support will focus attention on nutrient application timing and eventually encourage *voluntary* behavioral change as farmers incorporate this concern into their short-term planning.

## WHY IS RUNOFF RISK DECISION SUPPORT NEEDED?

Many of the nation's lakes and streams suffer from water quality degradation caused by excess nitrogen and phosphorus. These nutrient loads eventually concentrate in coastal areas such as the Great Lakes and Gulf of Mexico, contribute to harmful algal blooms and hypoxia, and result in both economic and environmental impacts. The Gulf of Mexico Hypoxia Task Force as well as the binational Great Lakes Water Quality Agreement have called for substantial nutrient load reductions from upstream states due to the increasing severity of ecosystem impacts.

Research has shown nonpoint nutrient sources, such as agricultural runoff, are a major source of these nutrients. Further, studies have indicated a few large runoff events per year can contribute a large portion of the annual load. As applications generally occur during the riskiest times of year for runoff (fall through spring) it is easy to understand why there is strong demand for a short-term Runoff Risk decision support tools.

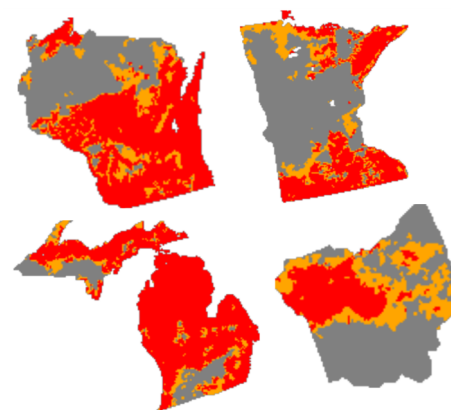
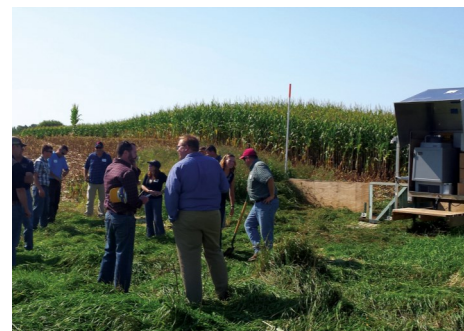
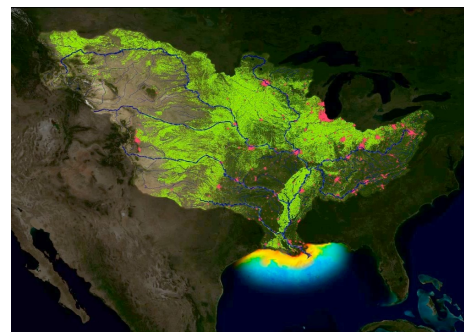
Highlighting the need for this type of tool, Runoff Risk was initiated by Wisconsin legislative action in 2006 after a winter and spring with many contaminated runoff events. A state agriculture extension agent's knowledge of NWS modeling helped incorporate the NWS into a multi-partner working group that developed the first generation Runoff Risk tool in Wisconsin, the Runoff Risk Advisory Forecast (RRAF).



Version 1 of Wisconsin's Runoff Risk Advisory Forecast, developed in collaboration with the state, NWS North Central River Forecast Center and many additional partners.

## HOW IS RUNOFF RISK INFORMATION GENERATED?

Forecast models used by the NWS North Central River Forecast Center (NCRFC) incorporate forecast precipitation, temperatures, snowmelt, and soil conditions data out to 10 days into the future. The resulting information is used by state groups to determine risk levels and develop guidance based on observations collected at the field scale. State working groups create maps and develop websites for producers in their states. It is important to note that Runoff Risk is meant to supplement decisions and is not promoted as a regulatory tool.



Runoff Risk prototypes of version 2 scheduled for completion in 2017

## WHO CAN I CONTACT FOR MORE INFORMATION?

NWS NORTH CENTRAL RIVER FORECAST CENTER

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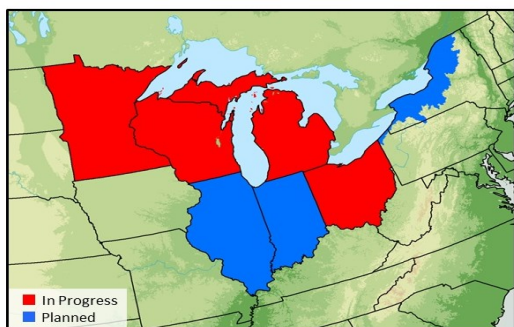


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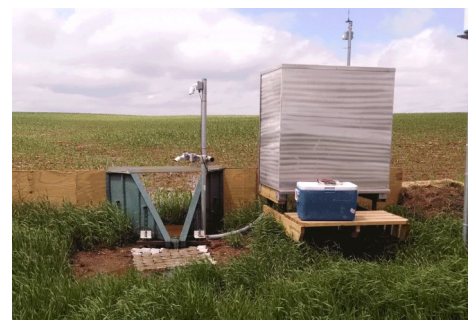
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## GREAT LAKES RESTORATION INITIATIVE SUPPORT

The NWS North Central River Forecast Center (NCRFC) partnered with the Great Lakes Restoration Initiative and the Environmental Protection Agency (EPA) in 2014 to expand and improve the Runoff Risk tools across the Great Lakes region. Testing in the first four states—Minnesota, Wisconsin, Michigan and Ohio (shown in red) is expected to begin in spring 2017 while the second round of states—Illinois, Indiana, and parts of New York (shown in blue) will start development later in 2017.



Additional GLRI support will support social science research to understand the agronomic and economic value of the tool and determine if the use of the tool has an impact on the amount of nutrients reaching Lake Erie.



## FUTURE IMPROVEMENTS AND GOALS

The demand for Runoff Risk decision support guidance is expected to grow with increasing awareness of these tools in addition to more attention focused on nutrient pollution impacts to the Great Lakes and the Gulf of Mexico. Further, the state working groups developing these tools desire to continuously incorporate new research and improved models. In order to address these needs the NCRFC is exploring the process to incorporate Runoff Risk into the new NOAA National Weather Service National Water Model framework.



## MULTI-PARTNER COLLABORATION IS ESSENTIAL

Runoff Risk decision support tools are a unique example of collaboration between state working groups, federal and state agencies, universities, and the agricultural industry to develop real-time tools and provide guidance to help states address the issue of nutrient application timing where a lack of guidance currently exists. The Great Lakes Restoration Initiative has been instrumental in the advancement and expansion of runoff risk decision support, and NOAA Sea Grant and NOAA Regional Collaboration Teams have provided support in facilitating regional networks, expertise, communication, and outreach in support of this effort. Additionally, the NOAA Central Region Team supports outreach efforts, including a [full length video](#) and [short trailer](#) to educate on hypoxia, HABs, and Runoff Risk Decision Support.



## WHERE CAN I LEARN MORE....

### Runoff Risk Decision Support

[http://www.regions.noaa.gov/great-lakes/index.php/great\\_lakes-restoration-initiative/nearshore/nutrient-runoff-risk-advisory-tool/](http://www.regions.noaa.gov/great-lakes/index.php/great_lakes-restoration-initiative/nearshore/nutrient-runoff-risk-advisory-tool/)

### Wisconsin's Runoff Risk Advisory Forecast

<http://www.manureadvisorysystem.wi.gov/app/runoffrisk>

